

Smoky Canyon Mine Remedial Investigation/Feasibility Study

Phase 2 Pilot Study Work Plan and Sampling and Analysis Plan

**Ultra-Filtration/Reverse Osmosis and Biological Selenium
Removal Fluidized Bed Bioreactor Treatment Technology**

Final – March 2017

Addendum 01 (Biosolids Dewatering) – August 2017

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3.1.10 Biosolids Dewatering

The Phase 2 Pilot Study treatment system, also referred to as the Hoopes Treatability Study Pilot (TSP), involves treatability testing of ultra-filtration/reverse osmosis and fluidized bed bioreactor technologies. The Hoopes TSP generates solids through biological growth in the fluidized bed reactor and the activated sludge system of the post-treatment system. Inorganic solids are also generated via precipitation of phosphorus through the addition of metal salts. The phosphorus precipitates are filtered out in the sand filter and are incorporated into the solids of the post-treatment system. Dewatering of the biosolids generated at the facility is identified as part of pilot unit optimization (see last bullet in Section 3.3.1), and is planned to reduce the volume of biosolids to be disposed and, thus, to reduce hauling costs and landfill tipping fees. Solids are commonly dewatered at water treatment facilities using mechanical methods which can include belt filter presses, centrifuges, and screw presses.

Dewatering of biosolids generated on site by the Hoopes TSP is planned via centrifuge dewatering, based on results of testing biological solids generated within the fluidized bed reactor for suitability for centrifuge dewatering. Dewatering will require the addition of a centrifuge and mechanical systems to support the centrifuge. These mechanical systems will include sludge feed pumps, polymer feed systems, coagulant feed systems, and other associated equipment. The mechanical support systems for the centrifuge are currently on site and used for other processes. A process flow diagram of the centrifuge dewatering system is shown in Figure 3-8A. The systems will be reconfigured to continue to support current uses and intermittent use during centrifuge dewatering.

A section of the existing building at the Hoopes TSP will be walled off from the remainder of the building to minimize air exchange with the dewatering operations, which will minimize objectionable odors within the main building. This new dewatering area will include a mechanical platform which will elevate the centrifuge above a receiving bin. Dewatered biosolids will fall by gravity directly to the receiving bin which will be periodically transported to a Subtitle D landfill, such as the Bannock County Landfill, for final disposal of the biosolids. Section 3.4 identifies dewatered biosolids as an investigation-derived waste (IDW), details the procedures for managing IDW, and will direct the procedures for testing prior to landfill disposal. Protocols for sample collection are provided in Section 6.2, with details on IDW sampling and analysis presented in Section 6.2.3.

The centrifuge dewatering system planned for the Hoopes TSP will be sized for a 50 gallons per minute (gpm) feed rate at an estimated 2 to 4 percent feed solids concentration. The final dewatered biosolids concentration is anticipated to be 12 to 25 percent total solids. Table 3-7A shows the centrifuge dewatering system design parameters. Biosolids dewatering will not be a continuous process but will be conducted on a batch basis depending on solids generation rates and available tank volumes. It is estimated that the system will dewater 130 pounds of total solids

per day of operation. Final total biosolids volumes will be determined based on the solids generation rate within the system. All mechanical dewatering equipment requires polymer addition to provide for adequate solids capture and final solids concentration. Polymer selection for the dewatering system will require jar testing as well as polymer trials via the full-scale system.

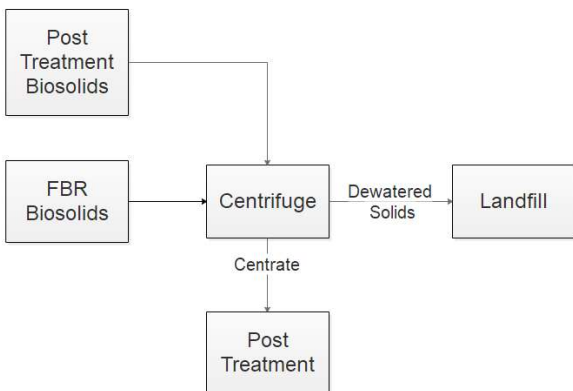


Figure 3-8A: Biosolids Dewatering Process Flow Diagram

Table 3-7A: Biosolids Dewatering Design Parameters

| Parameters | |
|-----------------------|---|
| Thickened Sludge Pump | 1 pump, 50 gpm, 5-HP |
| Centrifuge | 1 unit, 50 gpm @ 2% solids, 50-HP drive motor |
| Centrate pump | 1 pump, 50 gpm, 2-HP |
| Solids Bin | 1 unit |